CONSIDERING A RESEARCH CAREER?
OPTIONS, CHALLENGES, FACTS, AND ADVISE

CS 591: November 4, 2009

Susanne Hambrusch
Department of Computer Sciences

WHY A RESEARCH JOB?

• Want to shape the future of the field
• Want to choose what to work on
• Want to stay in academia and teach as well as do research
• Continuing to do research sounds like the right thing/best thing/only thing to do after a Ph.D.
ACADEMIC RESEARCH INSTITUTION

- Start as an Assistant Professor
  - Job security after tenure
- Main expectations
  - Establish an independent research program
  - Publish in conferences and journals
  - Obtain external funding
  - Teach and work with students
  - Service (department, professional, university)
INDUSTRIAL RESEARCH LABS

- Expect to work on problems relevant to the company
  - real world problems
  - access to real data sets
- Generally no funding pressure
  - securing funds for travel etc. may require effort
- Patents often more important than papers
  - not all work may be published
- Yearly evaluation includes your value to the company
- Not a stable environment in the longer term

GOVERNMENT LABS

Research focus based on perceived benefit to nation

- Basic research (LBNL, NASA, NOAA, NREL, etc.)
  + Global warming, alternative energy, disease cures, basic science research, space exploration
  + Non-profit mentality
  + Open research environment, international community
- Weapons labs (LLNL, Sandia, LANL, ORNL, etc.)
  + May need security clearance or US citizenship
  + Projects of national importance may have considerable funding
  + High level of security (limited ability to publish)
COMPARISONS

Pay
+ Pre-tenure academia, govt labs, industry & tenured academia

Job security
+ Industry, government, academia

Research freedom
+ Industry, government, academia

Funding and amenities
+ Unclassified govt labs, academia, weapons labs, industry

You are here
Receive your Ph.D.

Post-doc
Research faculty
Tenure-track faculty @ research institution
Industrial lab
Government lab
Tenure-track faculty @ teaching institution
All other
POST-DOC/RESEARCH FACULTY

- Post-doc
  - supported from a faculty’s research grant
  - post-doc fellowships from funding agencies or professional organizations (NSF, ONR, CRA)
- Research faculty
  - secure their own funding (“soft money”)
  - academic rank promotion possible in some institutions
  - may or may not involve teaching

TEACHING POSITIONS

- Undergraduate institutions
  - Top rated liberal arts colleges have excellent students
  - Hiring standards and expectations often very high
- Institutions with no major Ph.D. program
  - Have higher teaching load
  - Expect faculty to be research active
DO'S (1)

- Have ambitious goal
- Have a broad research plan
- Know when to give up and pursue another idea
- Publish
- Collaborate and publish
- Pursue submissions to conferences and journals
- Attend conferences
  + Start with regional events
  + Explore various funding options
- Improve your communication and writing skills

DO'S (2)

- Take advantage of opportunities
  + Mentoring, applying for fellowships, etc
- Get used to rejection
  + Rejection is part of professional life
- Get help and ask for advice
  + Figure out what will work for you
- Network
- Get to know the researchers in your area
  + Senior researchers are often more accessible
- Follow faculty hiring in the department
DO'S (3)

- Have a professional webpage
- Act in a professional way
- Know the relevant professional organizations and what they can do for you
  + ACM, CRA, IEEE, Special Interest Groups
- Realize that your first job you take may be the most crucial one

DON'TS

- Don’t rush and graduate with the minimum
- Don’t plan out every detail of your research or your career path
- Don’t be a complainer/whiner
ACADEMIC DECISIONS

Research University or Teaching College?
- Do you like teaching? Research? Both?
- Would you be more comfortable in a big department or a small one?
- Do you want to work primarily with graduate students? Undergraduates?
- What is your risk tolerance?
- How important is salary? Location?

INDUSTRY/GOVERNMENT DECISIONS

Industry, unclassified or classified gov’t lab?
- Do you prefer to set your own research direction or work with a large project?
- Would you be more comfortable in a big department or a small one?
- How important is the opportunity to publish (vs. keeping your discoveries proprietary or classified?)
- Would you be willing to modify your research direction based on availability of funding?
- What is your risk tolerance?
- How important is salary? Location?
PURSUE A POSTDOC POSITION?

- Taking a post-doc position is becoming more common in CS (standard in other fields)
- Funding opportunities exist
  - NSF, ONR, ...
  - CRA's CI Fellows program
  - Industry and government labs
  - Well funded research groups (often no official ads)
  - A significant number have citizenship requirements (but not at unclassified gov’t labs)

WHAT IS OFTEN NOT SAID

About teaching oriented institutions
- Many expect faculty to have a research program
- Pay is poor compared to University and Industrial positions
- Teaching loads are high (and no grad TAs)
- Teaching positions at research universities might pay better and have a lower teaching load
  - Usually little status and often a year-by-year contract
WHAT IS OFTEN NOT SAID

- Most departments hire junior faculty expecting to award tenure
  - Hiring and mentoring of junior faculty is expensive, in time and money
  - Making a hire is a big investment for a department
  - Their goal is to hire people who will be successful

WHAT IS OFTEN NOT SAID

About government labs and soft money
- Most gov’t labs hire expecting/hoping to keep you until retirement
- Making a hire is a big investment for a lab
  - Want people who will be successful team players
- Bringing in your own funding gives you independence and status
WHAT DEPARTMENTS ARE LOOKING FOR

❖ Research university metrics
  ➢ Papers in top conferences, some journal papers and submissions
  ➢ Great letters (esp. strong advisor support)
  ➢ Good department fit (neither too many in your research area or no one)

❖ Teaching college metrics
  ➢ Papers in conferences
  ➢ Teaching enthusiasm and experience
  ➢ Understanding of teaching institutions

❖ Factors out of your control
  ➢ Number of slots, desirable areas, who else applied/is interviewed, etc

WHAT LABS ARE LOOKING FOR

❖ Unclassified government lab metrics
  ➢ Good fit with existing funding program
  ➢ Easy to work with and flexible: willing to work on existing lab projects, good software developer
  ➢ Good publication record, great letters (esp. from lab internships)

❖ Classified government lab metrics
  ➢ Able to obtain security clearance, comfortable in secure environments with many restrictions
  ➢ Willing to work on lab mission within large projects, good software developer

❖ Industry lab metrics
  ➢ Good fit with company mission, easy to work with and flexible, smart